

A SUGGESTIVE MAYA INSCRIPTION

BY

CHARLES P. BOWDITCH

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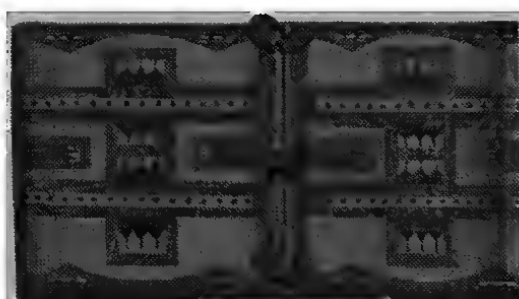
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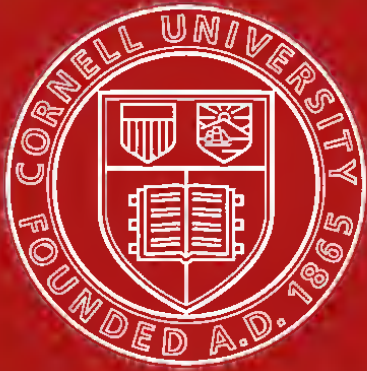


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ERRATA.

A METHOD WHICH MAY HAVE BEEN USED BY THE MAYAS IN CALCULATING TIME, Cambridge, 1901.

Page 11, column 3, line 18. For 2. 6. 9. 0. 0. read 2. 7. 9. 0. 0.

“ “ “ 19. “ 2. 9. 1. 13. 0. “ 2. 10. 1. 13. 0.

NOTES ON THE REPORT OF TEOBERT MALER IN MEMOIRS OF THE PEABODY MUSEUM, Vol. II., No. I., Cambridge, 1901.

Page 3, line 26. The sentence beginning on this line should read: “If the date is 7 Muluc 12 Zac ①⑥, it occurs in Katun 10 of Cycle 9 and its place is 54. 9. 10. 4. 13. 9. of Goodman's Tables, while 6 Muluc 12 Zac ②⑧ occurs in 54. 9. 10. 16. 16. 9.”

NOTES ON THE REPORT OF TEOBERT MALER IN MEMOIRS OF THE PEABODY MUSEUM, Vol. II., No. II., Cambridge, 1903.

Page 14, line 28. For E 9 read E 8.

“ 15, “ 5 “ E 9 “ E 8.

“ 15, “ 8 “ E 9 “ E 8.

“ 17, “ 6 “ Initial read Supplementary.

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THE Mayas had three methods of marking a fixed date. The first of these was accomplished by stating the name of one of the twenty days together with its number, and declaring it to be a given day of a given month. This fixed a day exactly within the limits of fifty-two years. The second method was by stating that between the given day and a date far in the past, a certain number of days had elapsed. The date in the past, from which the count was made, was called 4 Ahau 8 Cumhu. Almost all the Initial Series on the monuments of Central America show dates which are over 1,300,000 days from 4 Ahau 8 Cumhu. The system of numeration used by the Mayas to denote these large numbers was to a great extent vigesimal, and the periods so used have received the following names from many of the leading Americanists:

Kin,	1 day.
Uinal = 20 kins,	20 days.
Tun = 18 uinals = 360 kins,	360 days.
Katun = 20 tuns = 360 uinals = 7,200 kins,	7,200 days.
Cycle = 20 katuns = 400 tuns = 7,200 uinals = 144,000 kins,	144,000 days.

In the inscriptions apparently 13 cycles are needed to make one of the next higher term, while in the manuscripts 20 cycles are used to reach the next higher term. These periods are expressed on the inscriptions either by more or less geometrical forms or by faces, while the numbers which tell the number of the periods are expressed by either the line and dot method or by faces. In the manuscripts the terms of this series are usually shown simply by the position, the higher terms being above the lower ones. In this article I use the method by position,¹ except

¹ I omit the designation of the glyph called by Goodman the "grand cycle" glyph, as I think the evidence which we now have tends to disprove this meaning.

that instead of having the higher terms above the lower, the higher terms will be placed at the left of the lower; thus a date given as 9. 12. 2. 0. 16., means that 9 cycles of 144,000 days, 12 katuns of 7,200 days, 2 tuns of 360 days, 0 uinal, and 16 kins have passed. This is equal to a total of 1,383,136 days, and counting this from 4 Ahau 8 Cumhu, there can be but one day reached, which is 5 Cib 14 Yaxkin, a date which appears on two stelæ of Piedras Negras. In stating a date by this method the Mayas did not speak of a current period, but of a period elapsed.

The third method of fixing a given date is by using the first method given above and declaring that this date is in a given katun. As this date can only occur once in fifty-two years and as a katun extends over a period of less than twenty years, it is evident that a given date occurring in a given katun cannot occur twice in the same katun. Therefore such a day expressed as belonging to a given katun fixes that day with absolute certainty in a term of over seven hundred years. And more than this, if the date is stated as occupying a particular position in a given katun, as for instance the beginning day of a katun, such a combination will not occur again for many thousand years.

As is well known the inscriptions on monuments and buildings in Central America contain between forty and fifty Initial Series, in which a date is expressed by the first and second methods as given above. In addition to this, dates are often expressed in the inscriptions by the first and third methods given above, and this would be nearly as accurate a way of fixing a date as the combination of the first and second methods. The advantage of expressing dates by the first and second methods is that if any error should occur in carving either the day or month glyph or the number and period glyphs, one method would tend to correct the other.

Whether Dr. Seler's explanation of the meaning of this glyph is correct is still uncertain.

If it were possible to connect with certainty the date 4 Ahau 8 Cumhu, from which all these other dates are counted, with our own chronology, we could easily reach a clear knowledge of the dates on which these monuments were erected and these inscriptions were carved, always provided, however, that the dates so given are records of the dates of the erection of the monuments, or at least of the buildings in which the inscriptions are found; and this, I think, is now generally conceded to be the case in almost all instances. Where several dates are found on the same inscription, it will perhaps be safe to take the latest one as the date of erection of the monument or building. Although it may not be possible to connect these dates with our own chronology, it is certainly possible to make use of them to assign the time when these monuments were erected, and when the cities which contain them were flourishing, in relation to each other.

Omitting from consideration certain dates, which would seem to be traditional, or merely samples of mathematical calculations, I give in the following table the earliest and latest dates of most of the cities of Central America in which the dates can be deciphered with certainty.

Dates marked "A" are stated by combinations of the first and second methods; those marked "B" by a combination of the first and third methods:

	Earliest Date.						Latest Date.					
Copan, ¹	A	9.	6.	10.	0.	0.	A	9.	16.	10.	0.	0.
Palenque { ^{only sure} Initial Series},	A	9.	8.	9.	13.	0.	B	9.	13.	0.	0.	0.
Piedras Negras,	A	9.	8.	10.	6.	16.	B	9.	14.	0.	0.	0.
Yaxchilan,	B	9.	8.	8.	4.	5. (?)	B	9.	17.	0.	0.	0.
Quirigua,	A	9.	14.	13.	4.	17.	A	9.	19.	13.	0.	12. (?)
Seibal,	B	10.	0.	0.	0.	0.	B	10.	1.	0.	0.	0.
Chichen Itza { ^{only date} known.},	A	10.	2.	9.	1.	9.						

¹ It is, of course, entirely possible that future discoveries will show dates earlier and later than those that are given here, and it may be, therefore, necessary to alter the views which are here expressed, if such discoveries are made.

The relative position of the cities can be seen by a glance at a map. The River Motagua flows in a northerly direction in Guatemala near the boundary between Guatemala and Honduras, and falls into the Caribbean Sea. At an elevation of 1700 feet above the sea and not far from the Motagua River and within the limits of Honduras, Copan is situated. Quirigua is in Guatemala near its eastern boundary and close to the Motagua River and about twenty-five miles from Copan as the crow flies.

The River Usumacinta also flows northerly, but it falls into the Bay of Campeche, a portion of the Gulf of Mexico. For a part of its course it forms the boundary between Guatemala and Mexico. Yaxchilan is on the Mexican side of this river, while Piedras Negras is farther down and is in Guatemala.

Palenque is in Mexico on a branch of the Usumacinta, and is much nearer the sea than the other cities. Higher up a large branch flows into the Usumacinta from the east; this is called the Rio de la Pasion; and on its south bank and directly south of Yucatan is Seibal. This ruin is in the northerly part of Guatemala. Tikal is in the very northeasterly corner of Guatemala, close to British Honduras, and almost exactly south of Bacalar in Yucatan, while northwest of Bacalar lies Chichen Itza. Tikal is about seventy or eighty miles from Seibal and on the direct road from that place to Bacalar, and nearly on the direct road to Chichen Itza.

The traditions of the Mayas were that a part of their ancestors came from a westerly direction. Let us see what possible migrations the dates which we have found suggest to us. Wherever they came from they were apparently settled in Copan in 9. 6. 10. 0. 0.; in Palenque in 9. 8. 9. 13. 0., and in Piedras Negras in 9. 8. 10. 6. 16., and in Yaxchilan in 9. 8. 8. 4. 5. It would seem as if the race had come from the south and west, and while one branch pressed along the mountain ranges to Copan, another had settled in

the Usumacinta Valley at Palenque, Piedras Negras, and Yaxchilan, certain dates of these three cities being less than one year apart. Copan extended itself along the river, and somewhere about 9. 14. 0. 0. 0. it may have sent forth a colony to Quirigua or may have decided to form a new settlement to which the whole city might move later. At all events we find no initial date later than 9. 16. 10. 0. 0. in Copan, while Quirigua flourished until nearly ten cycles had elapsed.

The latest date on the Usumacinta River is 9. 17. 0. 0. 0., while the latest date of Quirigua is 9. 19. 13. 0. 12., less than seven years before the end of the cycle, and it must have been about this time that the emigration northward occurred. Emigrants going from Quirigua to Lake Ysabal and up the Rivers Polochic and Cahabon would have easily reached the head-waters of the Pasion on which Seibal is situated, while a comparatively short land journey would have enabled the inhabitants of Piedras Negras and of Yaxchilan to reach the same place. From there a short journey would have brought them to the Island of Flores in Lake Peten, and another short journey would have taken them to Tikal, whence their march would extend to Bacalar and Chichen Itza. If this migration occurred, and if a date were to be found in Tikal, we should expect it to lie between 10. 0. 0. 0. 0., which is found in Seibal, and 10. 2. 9. 1. 9., found in Chichen Itza. In fact we find on a wooden carving, now in the Museum at Basel and taken from Tikal, a date given twice and reading 3 Ahau 3 Mol, and this date is found in 10. 0. 15. 8. 0. It is true that 3 Ahau 3 Mol is also found elsewhere, but the same date, 3 Ahau 3 Mol, is followed on the second carving by the glyph given in Fig. 2. Here the head is the well known cycle glyph, the lower part of the prefix is also well known as meaning zero, while the central part is clearly 15 and the upper part is unknown. This glyph may well mean that no katuns and 15 tuns are to be counted in the given

cycle, and this will fix the place of 3 Ahau 3 Mol beyond peradventure.¹

I have attempted in my article on the "Age of the Maya Ruins," to show the possibility of agreement between the statements of the Books of Chilán Balam and the dates on some of the inscriptions. Following in the same line, we learn from the Book of Chilán Balam of Mani that in Ahau 6, the discovery of Ziyán caan or Bakhalal took place.² This is clearly the same as Bacalar. We learn also that they ruled in Bakhalal for about sixty years, until Ahau 13, and while they ruled there Chichén Itzá was discovered. At the latter place they ruled for about 120 years or until Ahau 1. It must be remembered that the ahaus, which, as given here, are the same as katuns, are numbered 13. 11. 9. 7. 5. 3. 1. 12. 10. 8. 6. 4. 2. 13., etc.

The Book of Chilán Balam of Tizimin relates that in Ahau 8, about twenty years before Ahau 6, Chichén Itzá was "learned about" and that the "discovery of the province of Zian took place." This book also states that in Ahau 13 "Pop was counted in order," and that in Ahau 1 Chichén Itzá was destroyed after a residence of 120 years there. The Book of Chilán Balam of Chumayel states that in Ahau 6 Chichén Itzá was discovered, that in Ahau 13 "Pop was set in order," and that in Ahau 10 Chichén Itzá was abandoned. (This is forty years after the date fixed by the Book of Tizimin.) In spite of the discrepancies in these accounts, it seems clear enough that the emigrants reached Bacalar or Bakhalal before they came to Chichén Itzá. Their earlier wanderings are also set forth in these books, and while the location of Tula, Chacnouitan, and the earlier cities cannot be absolutely determined, the names of Bacalar and Chichén Itzá are well known.

¹ I think that this is a far more probable date than that suggested by Seler in his valuable article on Tikal published in the "Zeitschrift für Ethnologie," January, 1901.

² See "The Maya Chronicles," by Dr. Daniel G. Brinton.

If, then, they journeyed from Seibal to Tikal and thence to Bacalar, the date of 3 Ahau 3 Mol, 10. 0. 15. 8. 0., is a probably accurate one.

Another proof, however, is found to support this opinion. As has been seen, the Books of Tizimin and Chumayel state that "Pop was set in order" about this time. Pop was the first month of the year, and as Bishop Landa states, the year began in his time on the 16th of July. It is evident that if no intercalary days were added or if the right number were not added, the year dates would no longer agree with the seasons, and after long wanderings it would be very probable that Pop, or the beginning of the year, would need to be "set in order."

The method adopted by the Mayas for making their dates correspond with the seasons is not clearly or definitely stated anywhere. Bishop Landa says, "Tienen su año perfecto como el nuestro de CCC y LXV dias y VI horas. . . . Destas seis horas se hazian cada quattros años un dia y assi tenian de quatto en quatto años el año de CCCLXVI dias." The manuscripts do not seem to show this. Pages 46-50 of the Dresden Codex would seem to show that for 104 years no such addition was made, unless it was done without giving a name, or number, or a place in the month to the intercalated days. And the count of cycles, katuns, etc., on the inscriptions is to the same effect. It is certainly possible that as the count of time was of little importance to the common people who received from their priests and leaders their orders about ceremonies, planting, harvesting, etc., the day and month count, and the cycle and katun count were allowed to run along without change and that the priests kept an account of the extra days which had been added, or would have to be added, in order to keep their reckoning of days and seasons in accord. In this case every now and then the priests would have to make these calculations and find out just where they were in reference to the seasons.

Cogolludo,¹ Libro IV, Capitulo 5, says, "Contaban los años con trescientos sesenta y cinco dias divididos por meses de á veinte dias correspondiendo á los nuestros. . . . A diez y siete de Julio comenzaba el mes llamado Poop. . . ."

And we find the following statement made by Aguilar,² in the "Anales del Museo Nacional de Mexico," Tomo VI, page 95: "Contavan los años por Lunas de 365 dias como nosotros tambien. Contavan el año solar por meses de veinte dias, con seis dias de Caniculares, correspondiendo a nuestros meses por este orden . . . a 17 de Julio Poop. . . . Esta quenta de diez y ocho meses y los seis dias de Caniculares son los mismos 365 de nuestro año solar. . . . Assi ni mas ni menos usavan, y usan estos Indios sus refrancillos in estos 18 meses, y seis dias de Caniculares para sembrar y mirar por su salud, y curarse como nosotros en Verano, Estio, Otoño y Invierno."

The Mexican system of intercalation is also doubtful. Many authors think that the Mexicans added one day every fourth year; others that they added thirteen days at the end of every fifty-two years, while Leon y Gama in speaking of the intercalation of days every fifty-two years writes, on pages 52 and 53 of "Los Dos Piedras," as follows: "Dije aquellos 12 ó 13 dias, porque efectivamente un año intercalaban 12, y otro 13 dias; ó lo que es lo mismo, doce dias y medio en cada uno, ó 25 en el doble periodo nombrado Cehuehuetiliztli, que constaba de 104 años, como se ha dicho antes; empezando a contar los dias intercalares, en el primer ciclo, desde la media noche: . . . de manera que todos los dias del primer ciclo se contaban desde la media noche, y todos del segundo desde el medio dia; . . . con lo qual quedaban intercalados los 25 dias en el periodo mayor, ó doble ciclo de

¹ Cogolludo was a priest of the order of St. Francis, and took the habit on March 31st, 1629.

² Aguilar was a native of Valladolid in Yucatan. He studied in Mexico, and in 1588 received a doctor's degree from the college Santa Maria de Todos Santos.

104 años." Orosco y Berra thinks that they divided each 260 years into five sets of fifty-two years each, and that they added the intercalary days thus: 13, 12, 13, 12, 13. He refers to the Codex Borgia for the proof of this, but the passage hardly bears out his view. Humboldt follows Leon y Gama.

The Mexican and Maya calendars were constructed on practically the same principle, and it is hardly possible that the Mexicans, who were not as advanced as the Mayas in their general knowledge, could have surpassed them in the accuracy of their calculations of the needed intercalation of days. It is, therefore, very probable that we shall gain some knowledge of the method used by the Mayas in the use of their days by considering the Mexican method.

The inscription of Tikal, Fig. 1,¹ gives, in my opinion, some evidence of the system used by the Mayas. Bear in mind that about this time "Pop was set in order." On the inscription we find Glyphs 1 and 2, meaning 3 Ahau 3 Mol, which we have decided to be the date 10. 0. 15. 8. 0. Glyphs 4 and 5 give the distance for 3 Ahau

3 Mol to 6 Eb 0 Pop 2. 11. 12.

Glyphs 6 and 7 give 6 Eb 0 Pop,² which would

then be 10. 0. 18. 1. 12.

10. 0. 18. 1. 12 = 1,446,512 days = 3963 years and 17 days.

3963 years = 38×104 years + 11 years.

¹ Maudslay, in his "Biologia Centrali-Americana," shows the number 4 attached to the tun sign in Glyph 5 of this inscription, but a reference to Plate 12 of the "Compte rendu d'une mission scientifique en Espagne et en Portugal," par Léon de Rosny, Paris, 1882, will show that the number is 2.

² Dr. Seler chooses to consider that the glyph before Pop means the "day before," but I know of no authority for this except the unwillingness of Dr. Seler to follow Mr. Goodman's suggestion that the days of the month were numbered from 0 to 19—a suggestion which I think is supported by the facts in the case. In other words, I think the evidence is very strong in favor of the theory that the Mayas counted the days of their months—not as current days, but as days elapsed, as they did their cycles, katuns, tuns, uinals, and kins, and as we do our hours and minutes. Our astronomers use 0 hours 0 minutes in stating their observations.

If we consider that the Mayas allowed twenty-five days every 104 years, as is stated by Leon y Gama to be the system of the Mexicans, and one day for each four years on the shorter period, we should find that they would have to allow for this long period $38 \times 25 + 2 \times 1$ or 952 days in all. This is the exact number given on Glyphs 4 and 5, where 2. 11. 12. are noted.

Two methods are possible for intercalating these 952 days without disturbing the count.

One of these would be to follow our own method, by which we insert an extra day between the 28th of February and the 1st of March, which usually come together, and which on leap years are separated by the 29th of February. The inscription seems to show that this method was known by the Mayas, for, while Glyphs 6 and 7 give us 6 Eb 0 Pop, Glyph 13 is 1 Kin, the kin sign being placed between the open jaws made by Caban as the lower jaw and an unknown glyph as the upper jaw, and the date 7 Ben 1 Pop, the next day to 6 Eb 0 Pop appears on Glyphs 14 and 15. It is not impossible that Glyphs 8 to 12 may describe this method. This particular form of 1 Kin occurs very seldom in the manuscripts.

But there was another method of intercalation and this was to follow the Roman custom. The Romans simply counted the sixth of the Kalends of March over again, calling the day the bisextile. If then on reaching 6 Eb 0 Pop, the Mayas decided to follow this plan, they would have counted back 952 days to 3 Ahau 3 Mol or, what is the same thing, they would have given to 6 Eb 0 Pop the name of 3 Ahau 3 Mol, and would have begun counting the days between over again. When in doing this they had reached 6 Eb 0 Pop again, the tropical year and the calendar would have been found to be nearly in accord.

It has been suggested, however, that this may have been done simply as a record, and that there may have been no attempt to

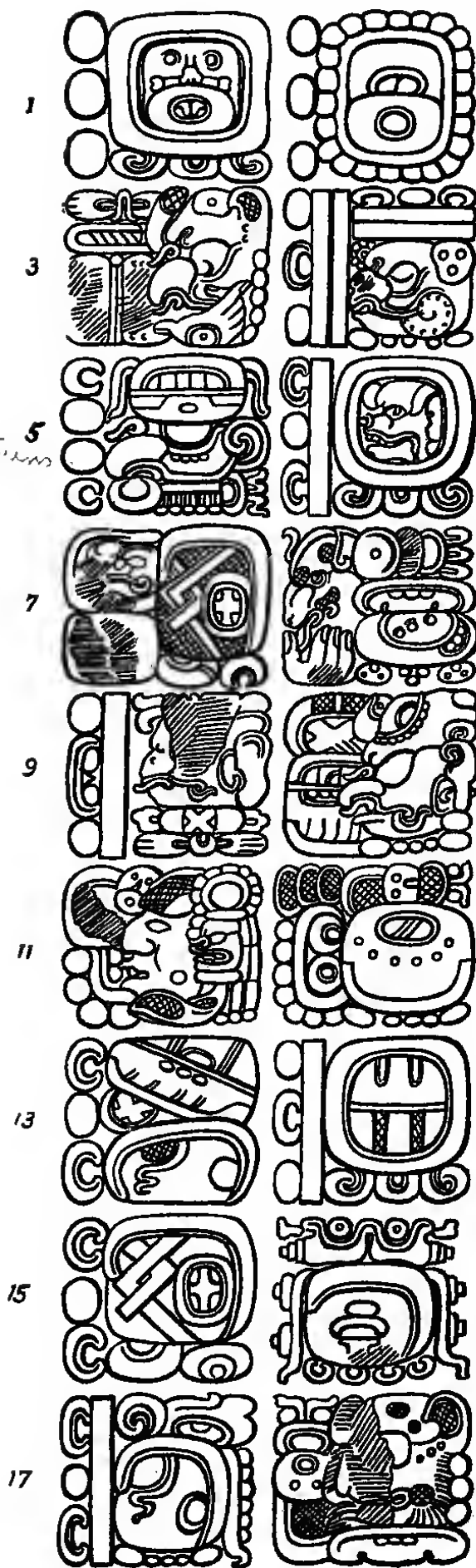


FIG. 1.

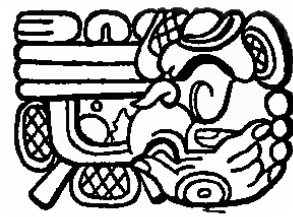


FIG. 2.



FIG. 3.



FIG. 4.

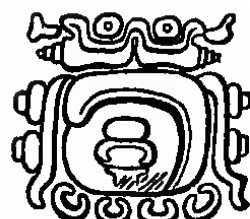


FIG. 5.

carry out the correction in a practical way; but I think it probable that they actually carried out this correction, and that this record of Tikal may be paraphrased in this way: "We have now reached the day 6 Eb o Pop, which should be the beginning of the year and the sun should be returning from its northward course, but instead of this it has not reached the end of its winter course towards the south. We should have added 25 days each 104 years since the beginning of time, or since 4 Ahau 8 Cumhu, and 1 day for each four years of the remaining years. This would have amounted to 952 days and we can add them now, if we wish. If we count the next 952 days without giving them number or name, the 953d will then be 1 Pop, but this will be a very cumbersome method, for how shall we be able to tell where we are with so many days without name or number? What we had better do is to count back 952 days to 3 Ahau 3 Mol and begin to count these days over again, so that when we reach 6 Eb o Pop again, we shall find the sun again coming back from his northerly journey."

As I have said before, we actually find the date 6 Eb o Pop, the 952 days which are needed to be intercalated, and the date 3 Ahau 3 Mol 952 days before 6 Eb o Pop, on the Tikal inscription. The date 3 Ahau 3 Mol would then be the beginning of the intercalated days, which were to be counted over. The prefix to Pop is somewhat blurred in Glyph 7, and it may be objected that this glyph may not mean o and is, therefore, not the beginning day; but such an objection is unsound, for in Glyph 13 we find a glyph for 1 kin or 1 day, and in Glyphs 14 and 15 is the date 7 Ben 1 Pop, just one day in advance of the last one.

It is interesting also to see that 160 days before 3 Ahau 3 Mol, or on the date 10. o. 15. o. o., the total number of days equal to 1,445,400 had passed. This equals 3960 years of 365 days each, or eleven times 360 years. It also equals 2475 times 584 days,

which is almost exactly the time of a synodical revolution of Venus. The date, then, must have been a significant one to the Mayas, since not only an exact number of years of 365 days each had passed, but this number was just eleven times 360 of such years. But an exact number of Venus revolutions had also passed. It would be wise, therefore, to look for a rectification of the Venus revolutions as well as for a rectification of the calendar, especially as in Glyph 16 we find the Venus symbol. The fact that the Mayas understood that a revolution of Venus was completed in 584 days needs no demonstration to a student who has carefully examined pages 46 to 50 of the Dresden Codex, where the glyphs of Venus, Figs. 3 and 4, are clearly marked. But if the Mayas had this knowledge and if they had made astronomical observations for a long number of years, they would naturally not only have known that the year of 365 days did not coincide with the tropical year, but also that the revolution of Venus was not exactly 584 days. The synodical revolution of Venus is really 583.92 days or $\frac{8}{100}$ of a day less than 584 days. The Mayas, of course, had no decimal system, and if they made any correction they would be likely to express it in a fraction with 1 for its numerator. As a matter of fact $\frac{1}{12}$ of a day is a very close approximation to $\frac{8}{100}$, and it would be natural for them to have decided that the correction should be made at the rate of one day in each twelve Venus revolutions. When 6 Eb 0 Pop had been reached there would have passed 1,446,512 days, or 2476 revolutions of Venus, and 528 days additional. If, then, in the correction of the calendar, they had called 6 Eb 0 Pop, 3 Ahau 3 Mol, and had again counted these days a second time, when they reached 6 Eb 0 Pop again, 952 additional days would have passed. This added on to 2476 Venus revolutions and 528 days would have made 2478 revolutions and 312 days. If now we carry out the correction of the Venus revolution, by dividing the

number of revolutions by twelve, we should have $206\frac{1}{2}$ days, or say 207 days, over which the Venus revolution had progressed beyond the distance to which the calculation of 584 days to a revolution had carried us. That is, on reaching 6 Eb o Pop a second time, 2478 revolutions would have passed and 519 days of the next revolution. This being the case, we find on the inscription in Glyph 13 one day marked, and in Glyphs 14 and 15 the date 7 Ben 1 Pop. On this date, then, 2478 revolutions and 520 days had passed. In Glyph 16 Fig. 5 occurs. And here we find as a superfix the Venus symbol, which we have seen so frequently on pages 46 to 50 of the Dresden Codex. Some calculation about Venus is surely going on, and when in Glyph 17 we find the date 6 Caban, and find that this date is just sixty-four days from 7 Ben 1 Pop, and further find that by adding this sixty-four days to the 520 days which had passed on the additional revolution of Venus it just completes this revolution, it would seem that there can be hardly any doubt that this was intended. In other words, on the day 6 Caban given in Glyph 17, 2479 Venus revolutions were exactly finished.

It may be objected that the methods adopted by the Mayas for correcting their calendar and the revolutions of Venus are not absolutely correct, and that, therefore, any such corrections would not have brought about a proper accordance of the calendar with the seasons and with the position of Venus. It is true that the methods are not exactly correct, but we have here an instance of where two mistakes have actually rectified each other as far as the name of the day is concerned. At the time when the date 6 Eb o Pop, or 10. 0. 18. 1. 12., first appears, 1,446,512 days had passed, or, on the basis of 365 days to the year, 3963 years and 17 days. The number of days to be intercalated under the Gregorian system would have been 960, and if we suppose that the Mayas went back 960 days and then counted these days over a second time, when

they had reached 6 Eb o Pop for the second time the additional 960 days would have been counted and the beginning of the year would have taken its proper place with the seasons. At this time the number of revolutions of Venus which had passed would be 2478.55, the new revolution having advanced 320 days. On the basis that the Venus revolution actually consisted of 583.92 days instead of 584 days, we should find that Venus had advanced $\frac{8}{100}$ of a day further for each revolution. This would have amounted to the sum of 198.28 days in the number of revolutions just given. Adding this number to 320, we have 518.28 days which the new revolution had passed through when 6 Eb o Pop occurred for the second time. The manuscripts then give one day and then state a date, which is sixty-four days farther in advance. Adding these two sums to 518.28 we get 583.28, whereas an additional revolution of Venus would have been 583.92, thus showing that in spite of the errors in the calculations of the Mayas, the Venus revolution would have ended on a day 6 Caban, the difference in the two calculations being less than a single day.

The Tikal inscription is, therefore, in my opinion, very strong evidence in support of the following views, viz.:

1. That astronomy is one of the subjects of which the inscriptions treat.
2. That the truth of the records of Chilan Balam is confirmed by the inscriptions, both in regard to the correction of the calendar and the migrations of the Maya races.
3. That the Mayas did correct their calendar shortly before their arrival at Chichen Itza and that at the same time they corrected their observations of the synodical revolution of Venus.
4. That the Mayas intercalated or at least calculated the intercalation of twenty-five days each 104 years, and allowed one day for each four years during portions of those periods.

If it should be found that several of the inscriptions are really calculations of the corrections which are needed in the calendar and in the synodical revolution of Venus, it may throw some light upon the table on page 24 of the Dresden Codex, where the number 2920 (or 8×365 , or 5×584) is the difference used, and which, together with many others of similar tables, I have for a long time regarded as multiplication tables, whatever they may be besides. But now we may find that it is also a division table in which the division takes place through subtraction.

For instance, supposing it was desired to find out how many times 2920, the common multiple of 365 and 584, appears in the date we have been discussing: 10. 0. 15. 8. 0., and that we know that 9. 9. 16. 0. 0. found in the second column equals 72 periods of 52 years, or 36 periods of 104 years, or 468 times 8 years.

From	10. 0. 15. 8. 0.	
we will deduct	9. 9. 16. 0. 0.	= 468 × 8 years,
leaving	10. 19. 8. 0.	
Again deducting the number found		
in the centre row of the page,	4. 17. 6. 0.	= 12 × 8 years,
there is left	6. 2. 2. 0.	
Again deducting	4. 17. 6. 0.	= 12 × 8 years,
leaving	1. 4. 14. 0.	
Again deducting the number found		
in the fifth row of the page,	1. 4. 6. 0.	= 3 × 8 years,
there is left	8. 0.	
We have then a total of		495 × 8 years,
		or of 495 × 5 Venus revolutions.

We find, then, that 10. 0. 15. 8. 0. = $495 \times 2920 + 160$ days. This, then, equals $8 \times 495 = 3960$ solar years of 365 days plus 160 days, or 2475 synodical revolutions of Venus plus 160 days, or putting this same result in the Maya form, 10. 0. 15. 8. 0. = 11. 0. 0. revolutions of the earth around the sun plus 160 days, or 6. 15. 15. synodical revolutions of Venus plus 160 days, as we found before.

